

**HUMAN SPACE FLIGHT
FISCAL YEAR 1998 ESTIMATES
BUDGET SUMMARY**

**OFFICE OF SPACE FLIGHT
U.S./RUSSIAN COOPERATIVE PROGRAM**

SUMMARY OF RESOURCES REQUIREMENTS(Thousands of Dollars)

U.S./RUSSIAN COOPERATIVE PROGRAM	FY 1996	FY 1997	FY 1998
Russian Space Agency contract support	100,000	100,000	--
Total	100,000	100,000	--

Distribution of Program Amount by Installation	FY 1996	FY 1997	FY 1998
Johnson Space Center	99,200	100,000	--
Kennedy Space Center	800	--	--
Total	100,000	100,000	--

PROGRAM GOALS

The United States and the Russian Federation have underway a joint cooperative space program to accomplish six major goals. First, the program permits us to develop, maintain, and enhance capabilities and operations to allow humans to live and work continuously in space. Second, by establishing a relationship with Russia as an international partner for the human exploration and exploitation of space, the United States can reduce the cost of future U.S. space initiatives by applying Russian-developed technology. Third, by flying Space Shuttle missions to the Russian Mir, the United States can enhance its understanding of long-duration operations, and gain life sciences and microgravity research benefits from long-duration experimentation. Fourth, early cooperation with the Russians permits us to develop common systems and operating procedures which will increase the probability of success and mitigate risks in the design, assembly, and operation of the International Space Station (ISS) in which they are a full partner. Fifth, by engaging Russia in constructive space work, the United States can advance its foreign policy initiatives. Finally, this relationship between the U.S. and Russian space agencies advances U.S. national space programs as well as U.S. aerospace industry.

STRATEGY FOR ACHIEVING GOALS

The U.S./Russian cooperative program includes only the contract with the Russian Space Agency (RSA) which provides services and hardware for Phase I and selected Phase II activities related to the International Space Station (ISS) program. The budget for the ongoing Shuttle/Mir program has been transferred to the ISS program from the Science, Aeronautics and Technology account, and is discussed in that budget section.

Phase I of the program expands the joint participation by U.S. and Russian crews in Mir and Space Shuttle operations. This expanded program uses the unique capabilities of the Space Shuttle and the Russian Space Station Mir and provides support for nine flights to Mir, including seven long-duration stays of U.S. crew. Phase I provides valuable experience and test data which will greatly reduce technical risks associated with the construction and operation of the ISS and provides early opportunities for extended scientific and research activities. The Russian Space Station's capabilities have been enhanced by contributions from both countries. The Space Shuttle has delivered new Russian-built solar arrays to replace existing arrays on Mir, and one of these new arrays uses solar cells provided by the U.S.. Russia has launched the Spektr and Priroda modules to its station, equipped with U.S., Russian, and other international scientific hardware to support science and research experiments. In 1996, NASA added an eighth and ninth shuttle flight to Mir. The additional flights are consistent with the Gore-Chernomyrdin Commission protocol signed on January 30, 1996. These additional flights will assist Russia in meeting its commitment to deliver key elements used in the early assembly of the ISS and will permit additional NASA astronauts to perform long-duration missions on Mir. The eighth and ninth Mir flights will use the Space Shuttle to reduce a significant logistics shortfall on Mir, conduct vital engineering research and expand our knowledge and experience of the effects of long-duration weightlessness. In addition, these extended Mir operations will assist Russia in its objective to extend the Mir on-orbit lifetime through FY 1999. This approach takes into account the joint US/Russian interest in continuation of the Shuttle/Mir program, while minimizing changes to the ISS development plan.

Phase II combines U.S. and Russian hardware to create an advanced orbital research facility with early human-tended capability. This facility will significantly expand the scientific and research activities initiated in Phase I, and will form the core of the ISS. Selected Phase II activities in the contract develop the systems capabilities, support, and other infrastructure to complete the ISS.

Under a fixed-price contractual arrangement with NASA, the RSA will furnish supplies and/or services to enhance Mir operational capabilities, perform joint space flights, and conduct joint activities which will assist in the design, development, operations, and utilization of the ISS.

During Phase I, the RSA will provide management, Mir lifetime extension, Mir capabilities expansion, docking hardware and mission support for both long-duration and short-term, joint

missions. Management activities include project documentation, and program and subcontract management. Mir lifetime extension includes system requirements planning, communication and control systems analyses and upgrades, thermal control documentation and requirements definition, environmentally-closed life support system (ECLSS) upgrades, power supply system upgrades, and propulsion systems documentation. To expand Mir capabilities, Spektr and Priroda modules were attached to the Mir for scientific use by Russia and the U.S.

Phase II combines U.S. and Russian hardware creating an advanced orbital research facility which enables early permanent human presence. This facility forms the core of the ISS. During this phase, the RSA will provide management, advanced technology, ISS elements, and associated analyses. ISS elements include: requirements definition of a joint airlock and delivery of androgynous peripheral docking system (APDS) hardware; service module modifications; FGB energy block modifications; delivery of repress/depress pumps for the airlock; and study and documentation related to a scientific power platform.

MEASURES OF PERFORMANCE

For this cooperative program, the level of performance will be measured by clearly defined, discrete results including successful docking and undocking of the Space Shuttle and Mir, successful joint operations between the Space Shuttle and Mir, exchange of crew, and delivery of both pressurized and unpressurized cargo. However, the most important and meaningful indicator of success will be completing the joint missions with our Russian partners, demonstrating our ability to work together in space safely and effectively, and laying the foundation for the unprecedented scope of our joint endeavor in building and operating the ISS.

The following events represent significant milestones in the successful completion of the U.S./Russian Cooperative program:

<u>Performance Milestone</u>	<u>Plan</u>	<u>Actual/Revised</u>	<u>Description Status</u>
Deliver hardware for U.S. Experiments on Priroda	3rd Qtr FY 1996	1st Qtr FY 1996	Designed, fabricated, tested and installed hardware for U.S. experiments on Priroda.
Launch U.S. experiments on Priroda	2nd Qtr FY 1996	3rd Qtr FY 1996	Priroda launch carried additional U.S. science experiments and equipment.
Deliver airlock depress/ repress pump assembly	3rd Qtr FY 1996	3rd Qtr FY 1996	Delivered airlock depressurization qualification unit.
Delivery of passive docking mechanisms	3rd & 4th Qtrs FY 1996	1st Qtr FY 1996, 3rd Qtr FY 1997	Delivery of two passive docking mechanisms (Passive 1 and 2), associated avionics, control panels, and documentation to support Phase II Space Shuttle flights to the ISS.
Delivery of docking mechanisms	2nd, 3rd, & 4th Qtrs FY 1997 & 1st Qtr FY 1998	2nd & 3rd Qtrs FY 1997; 1st, 2nd & 3rd Qtrs FY 1998	Delivery of five docking mechanisms, associated avionics and control panels for ISS/Shuttle.

ACCOMPLISHMENTS AND PLANS

mechanisms, delivery of astronaut consumable supplies, and modifications to the service module. During FY 1997, American astronauts will be continuously aboard Mir conducting scientific research. Funding for the original \$400M RSA contract under the U.S./Russian cooperative program concludes in FY 1997. However, some milestones, such as delivery of two docking mechanisms and two Shuttle docking missions to the Mir, will occur in FY 1998.